

Profiling af PHMR

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The Net4Care Project

Analyze, design, evaluate a software ecosystem for telemedicine in Denmark

- Allow for rapid application development
- Based on national and international standards
- Evaluation by integrating existing telemedicine prototypes

Partners and funding



Net4Care Vision

Research project

Strong focus on

- SMB support for Telemedicine (client side)

Backend: Use HL7/PHMR & XDS.b

- Rationale: All clinical systems will probably understand it soon 😊



Disclaimer

Breath or depth?

- Our contribution is rooted in Net4Care and other projects

We have not utilized all features of the Personal Health Monitoring Record !

Our focus has been simple valued measurements in a tele medicine setting.

Thus: It is not a comprehensive list!



Overview

Dansk PHMR profilering Status Sep 2013

Problemstillinger

Der skal vedtages og registreres Danske HL7 OID'er

Til unikt at identificere fx Danske CP numre, hospitaler, organisationer, kommuner, etc.

Der skal besluttes et kodesystem (eller flere) til at klassificere målingstyper

Dansk IUPAC?

Der skal besluttes hvad AUTHOR feltet repræsenterer i en telemedicinsk sammenhæng

Patienten selv? Apparatet? Udstedende læge?

Der skal undersøges og besluttes en måde at beskrive kontekst data

Fx. Regionerne ønsker at man ved en telemedicinsk måling kan se om det er borgeren selv eller en sundhedsmedarbejder der har foretaget en måling.

Net4Care har forslag gående på attributten 'methodCode' i PHRM

Det skal undersøges og besluttes hvordan apparater identificeres og klassificeres.

GMDN?

Endelig skal det vel også vedtages i hvor høj grad man benytter struktureret eller ustruktureret HL7 i selve PHMR body.

Eksempler fra MedCom dublerer data, både som struktureret/maskinlæsbart PHMR format, samt som tekst i <text> tags hvor det er formatteret som HTML, hvilket jo binder det til vores nuværende hang til web sider, men hvordan ser verden ud om 5-10 år?



OID'er

```
<recordTarget contextControlCode="OP" typeCode="RCT">  
  <patientRole classCode="PAT">  
    <id extension="251248-4916" root="2.16.840.1.113883.3.1558.2.1"/>  
    <addr>  
      <streetAddressLine>Skovvejen 12</streetAddressLine>  
      <city>Aarhus N</city>  
      <postalCode>8010</postalCode>  
      <country>Danmark</country>  
    </addr>  
    <telecom value="tel:86121824"/>  
  </patientRole classCode="PAT" determinerCode="INSTANCE">
```

```
<custodian typeCode="CST">  
  <assignedCustodian classCode="ASSIGNED">  
    <representedCustodianOrganization classCode="ORG" determinerCode="INSTANCE">  
      <id extension="1" root="2.16.840.1.113883.3.1558.10.6.1"/>  
      <name>Region Midt / Skejby Sygehus</name>  
      <telecom value="tel:78450000"/>  
      <addr>  
        <streetAddressLine>Brendstrupgaardsvej 100</streetAddressLine>  
        <city>Aarhus N</city>  
        <postalCode>8200</postalCode>  
        <country>Danmark</country>  
      </addr>  
    </representedCustodianOrganization>  
  </assignedCustodian>  
</custodian>
```



The OLD tree

I am not aware of a Danish root OID

– Net4Care acquired its own...

```
public static final String NET4CARE_ROOT_OID = "2.16.840.1.113883.3.1558";

// Branch 1 : Danish Medical coding systems
private static final String DK_MEDICAL_CODE_BRANCH = ".1";

// Requirement by Sekoia and Region Hovedstaden: Who is the person making the measurement
// Opsamler (egenopsamling/assisteret opsamling/behandleropsamling)
public static final String DK_MEASUREMENT_CONTEXT_AUTHOR_OID =
    NET4CARE_ROOT_OID + DK_MEDICAL_CODE_BRANCH + ".1";

// Requirement by Sekoia and Region Hovedstaden: How has the measurement been provided
// Provision: manual entered, electronic transmission
public static final String DK_MEASUREMENT_CONTEXT_PROVISION_OID =
    NET4CARE_ROOT_OID + DK_MEDICAL_CODE_BRANCH + ".2";

// Branch 2 : Danish public coding systems
private static final String DK_PUBLIC_CODE_BRANCH = ".2";
public static final String DK_CPR_OID = NET4CARE_ROOT_OID + DK_PUBLIC_CODE_BRANCH + ".1";

// Branch 10: Danish Hospital Organizational Units
private static final String DK_HOSPITAL_ORGANIZATIONAL_UNITS = ".10";

public static final String DK_REGION_MIDT = NET4CARE_ROOT_OID + DK_HOSPITAL_ORGANIZATIONAL_UNITS + ".6";

// Skejby sygehus
public static final String DK_REGION_MIDT_SKEJBY_SYGEHUS = DK_REGION_MIDT+".1";

// Devices used in the net4care project
private static final String DK_DEVICE_TYPE_ROOT_CODE = ".3";
```

What clinical code system to use?

```
<observation classCode="OBS" moodCode="EVN">
  <templateId root="2.16.840.1.113883.10.20.1.31"/>
  <templateId root="2.16.840.1.113883.10.20.9.8"/>
  <code code="20150-9" codeSystem="2.16.840.1.113883.6.1" displayName="FEV1"/>
  <value unit="L" value="3.42" xsi:type="EQ"/>
</observation>
</component>
```

Danish IUPAC?

Note: HL7 requires UCUM for units.

```
public class Codes {

  /** The LOINC code */
  public static final String LOINC_OID = "2.16.840.1.113883.6.1";
  /** The IUPAC code, as found in the HL7 registry (http://www.hl7.org/oid/index.cfm),
   * http://www.iupac.org. Perhaps Denmark has a profile with another OID ?
   */
  public static final String IUPAC_OID = "2.16.840.1.113883.6.47";
  /**
   * The code for waveform-observables from SNOMED CT
   */
  public static final String SNOMED_CT = "2.16.840.1.113883.6.96";
}
```



Who is the author of a tele measurement?

- The device?
- The patient as a person?
- A clinician?

Net4Care suggestion

- *A measurement is made as part of a treatment, i.e. A clinician has prescribed that a patient should use a (set of) device(s). The prescribing clinician is the author [but measurement context preserved]*



Measurement Context

Regions request that context is preserved

- Who made the actual measurement
 - Clinician? Patient? Aided by care giver?
- How was data provided
 - Electronic (wire, bluetooth)? Manual (entered)?

PHMR methodCode may be used



methodCode

```
<component typeCode="COMP">
  <section>
    <templateId root="2.16.840.1.113883.10.20.1.14"/>
    <templateId root="2.16.840.1.113883.10.20.9.14"/>
    <code code="30954-2" codeSystem="2.16.840.1.113883.6.1"/>
    <title>Results</title>
    <text>Dry body weight Measured:72.6 kg</text>
    <entry typeCode="COMP">
      <organizer classCode="CLUSTER" moodCode="EVN">
        <templateId root="2.16.840.1.113883.10.20.1.35"/>
        <statusCode code="completed"/>
        <component>
          <observation classCode="OBS" moodCode="EVN">
            <templateId root="2.16.840.1.113883.10.20.1.31"/>
            <templateId root="2.16.840.1.113883.10.20.9.8"/>
            <code code="8341-0" codeSystem="2.16.840.1.113883.6.1" displayName="Dry body weight Measured"/>
            <value unit="kg" value="72.6" xsi:type="PQ"/>
            <methodCode code="CL" codeSystem="2.16.840.1.113883.3.1558.1.1" displayName="Målt af kliniker"/>
            <methodCode code="EL" codeSystem="2.16.840.1.113883.3.1558.1.2" displayName="Elektronisk overførsel"/>
          </observation>
        </component>
      </organizer>
    </entry>
  </section>
</component>
```

Require codes to be defined for context!



Device Info

Classification using GMDN

- PHMR is *not* very specific (essentially free text)
- Calibration date important for logistics

```
<section>
  <templateId root="2.16.840.1.113883.10.20.1.7"/>
  <templateId root="2.16.840.1.113883.10.20.9.1"/>
  <code code="46264-8" codeSystem="2.16.840.1.113883.6.1"/>
  <title>Medical Equipment</title>
  <text>Device properties: Type: Bloodmeter Model: BloodCraft-II Manufacturer: MyCompany Serial No: 584216 Part No:
  69854 Hardware Revision: 2.1 Software Revision: 1.1.</text>
  <entry typeCode="COMP">
    <organizer classCode="CLUSTER" moodCode="EVN">
      <templateId root="2.16.840.1.113883.10.20.9.4"/>
      <statusCode code="completed"/>
      <participant typeCode="SBJ">
        <templateId root="2.16.840.1.113883.10.20.9.9"/>
        <participantRole classCode="MANU">
          <playingDevice>
            <manufacturerModelName>MyCompany / Model: BloodCraft-II / Part: 69854</manufacturerModelName>
            <softwareName>SerialNr: 584216 / HW Rev. 2.1 / SW Rev. 1.1</softwareName>
          </playingDevice>
        </participantRole>
      </participant>
    </organizer>
  </entry>
</section>
```

111



Structured versus Unstructured Level

Use the '<text>' tags in PHMR? **No**

- Unstructured text containing human readable portion

Examples from internet uses HTML coding ☹️

- And only this is often rendered

```
<code code="46264-8" codeSystem="2.16.840.1.113883.6.1"/>
<title>Medical Equipment</title>
<text>Device properties: Type: Bloodmeter Model: BloodCraft-II Manufacturer: MyCompany Serial No: 584216 Part No:
69854 Hardware Revision: 2.1 Software Revision: 1.1.</text>
<entry typeCode="COMP">
  <organizer classCode="CLUSTER" moodCode="EVN">
```



... And

The *breath approach*

- Go through all issues/sections in the Standard Draft

Example

- Not adhered to in Net4Care's PHRM builder...
 - Pros: Clinical significance?
 - Cons: More expensive software

CONF-PHMR-53: If the following values are present in the PHMR, they **SHOULD** be recorded in the Vital Signs section: blood pressure, temperature, O₂ saturation, respiratory rate, pulse. All other values **SHOULD** be recorded in the Results section.



Not the issue here, but...

XDS.b requires the affinity domain to define

- Data formats
- URN identifiers to be used in registry

Ex.

- UNIK demo – Columna search required certain keywords to be in the *typeCode* field in registry entries
 - "urn:ad:net4care:teleobservation"



The End



